

Glossary/Acronyms

Adaptive management | A systematic approach for improving resource management by learning from management outcomes; the process of adaptive management involves a structured, iterative process of robust decision making in the face of uncertainty, with an aim to reduce uncertainty over time through system monitoring.

AOP | Annual Operating Plan is the framework used by GLERL for project planning and budgeting.

AUV | Autonomous Underwater Vehicles perform underwater survey mission (without operator intervention) and can be equipped with a wide variety of sensors to collect data, such as conductivity, temperature, and depth. When a mission is complete, the AUV will return to a pre-programmed location and data collected can be downloaded and processed the same way as data collected by shipboard systems.

Bibliometric | a statistical analysis of written publications.

Bioenergetics | The study of the transformation of energy in living organisms, involving the making and breaking of molecular chemical bonds.

CILER | Cooperative Institute of Limnology and Ecosystems, affiliated with NOAA Cooperative Institutes— a consortium of academic research institutes in the Great Lakes region—supporting NOAA's mission and goals.

CoastWatch | A NOAA program that obtains, produces, and delivers environmental data and products for near real-time observation. GLERL is the regional node for the NOAA CoastWatch program, providing access to near real-time and retrospective satellite observations and in-situ Great Lakes data.

CSMI | Coordinated Science and Monitoring Initiative is a multi-agency program (sponsored by the U.S. Environmental Protection Agency and NOAA) associated with the binational Great Lakes Water Quality Agreement that coordinates science and monitoring on each Great Lake over a five-year cycle. Outcomes from CSMI research will help advance an integrated understanding of the ecosystem dynamics of the Great Lakes system.

Cyanobacteria | Commonly referred to as 'blue-green algae', cyanobacteria are a genetically diverse group of photosynthetic bacteria found in marine, freshwater and terrestrial systems. In lakes, rivers and coastal regions, large blooms of cyanobacteria may foul coastlines with scums, are capable of producing toxins and can impact aquatic ecosystems (e.g. alter food web dynamics, reduce benthic vegetation and cause hypoxia (oxygen depletion) , fish kills and threaten animal and human health.

Dreissenid mussels | A family of freshwater mussels native to Eastern Europe. Two species, zebra and quagga mussels, were first introduced to the Great Lakes in the late 1980s and early 1990s, most likely via ballast water discharged from ships. These dreissenid mussels quickly spread and became established and, as efficient filter feeders, are linked to the collapse of the lower food web, which threatens valued fisheries such as trout and salmon.

EcoDyn | Ecosystem Dynamics, one (of four) of GLERL's integrated research branches.

Ecological Forecasting Roadmap | A NOAA-wide program to develop and apply ecological forecasting capability, providing access to dependable, high quality forecast products on a broader scale with consistent delivery.

EEO | Equal Employment Opportunity

Enterprise | A purposeful undertaking that generally requires the coordination of different organizations, types of expertise, and capital.

EPP | Educational Partnership Programs

ESP | Environmental Sample Processor is the current state-of-the-art instrumentation providing an in situ platform for identifying and quantifying marine organisms and their gene products. This electromechanical/fluidic instrument is designed to collect discrete water samples, concentrate microorganisms, and autonomously analyze samples utilizing molecular probe assays that will help in expanding our scientific understanding of the cyanobacterial community composition and toxicity during harmful algal blooms (HABs) in western Lake Erie.

FTE | A term used in reference to personnel position as a full time equivalent.

FVCOM | Finite Volume Community Ocean Model is a modeling tool that enables high resolution (30 meters – 2 km) unstructured grid (i.e., triangular shapes of adaptable size) representation of the coastal system; a better approximation of the integral form of the equations of motion; tracking of seasonal lake level fluctuations; inflows and outflows at major connecting channels; expanded coverage to connecting waterways (Straits of Mackinac, St. Clair River, Lake St. Clair, Detroit River, upper St. Lawrence River).

GLANSIS | Great Lakes Aquatic Nonindigenous Species Information System functions as a Great Lakes specific node of the USGS NAS national database. The GLANSIS database provides a core list of species nonindigenous to the Great Lakes basin (not native to any part of the basin). Also included in the database is a list of range expansion species (native only to a portion of the basin) and a watchlist (not currently found in the Great Lakes but assessed in the peer-reviewed scientific literature as of 2010 as likely to invade via current pathways).

GLCFS | Great Lakes Coastal Forecasting System is a set of hydrodynamic computer models that predict lake circulation and other physical processes (e.g., thermal structure, waves, ice dynamics) of the lakes and connecting channels in a real-time nowcast and forecast mode.

GLERL | Great Lakes Environmental Research Laboratory is one of seven of NOAA's research laboratories located across the country that conducts an integrated program of research, technology development, and services to improve the understanding of the Earth's atmosphere, oceans, and inland waters, and describe and predict changes occurring to them.

GLOS | Great Lakes Observing System is one of 11 Regional Associations of the Integrated Ocean Observing System (IOOS®), working to enhance the ability to collect, deliver, and use ocean and Great Lakes information. IOOS is a partnership among federal, regional, academic and private sector parties that works to provide new tools and forecasts to improve safety, enhance the economy, and protect our environment.

GLRI | Great Lakes Restoration Initiative is the largest multiagency effort in U.S history aimed at restoring and protecting the health of the Great Lakes. Since 2010, GLRI resources have been used to create measurable benefits for Great Lakes communities and habitats in the following five focus areas |

- Toxic Substances and Areas of Concern;
- Invasive Species;
- Nonpoint Source Pollution Impacts on Nearshore Health;
- Habitats and Species;
- Accountability, Education, Monitoring, Evaluation, Communication, and Partnership.

GLWQA | The Great Lakes Water Quality Agreement is a commitment between the United States and Canada to restore and protect the waters of the Great Lakes. The Agreement provides a framework for identifying binational priorities and implementing actions that improve water quality. Under the Agreement, The U.S. Environmental Protection Agency coordinates activities within the United States and Environment Canada coordinates those within Canadian.

Ground-Penetrating Radar | A geophysical method that uses radar pulses to image the subsurface of the earth.

GLRC | The Great Lakes Regional Collaboration is a unique partnership built upon a Presidential Order of 2004. Recognizing that the Great Lakes are a “national treasure” that is important to preserve and protect, the GLRC is designed to create a better coordinated program to maximize the efficiency of efforts and expenditures as well as to better measure progress resulting from project investments.

Great Lakes Water Level Dashboard | A data visualization tool serving as a multi-agency data portal for long-term, basin scale, time series data on hydrologic conditions (e.g., water levels), climate, and other environmental variables for the Great Lakes.

Green Ships | An initiative to convert all NOAA research vessels from petroleum-based fuels and lubricants to renewable and environmentally-friendly products to reduce fossil fuel emission, as part of its larger stewardship mission in the marine environment.

H-index | A metric that gives an estimate of the importance, significance and impact of a scientist’s cumulative research contributions. The index, calculated on the number of publications as well as citations, serves as useful criteria to evaluate scientific achievement.

HAB | Harmful Algal Bloom is the proliferation of cyanobacteria or algae resulting from rapid growth in response to high nutrient and/or light levels. These events can have severe impacts on the ecology of systems where they occur as well as on the socioeconomics of surrounding regions and the health of humans, wildlife, pets and livestock.

HAB Tracker | A forecasting tool, operated on an experimental basis that combines remote sensing, monitoring, and modeling to produce daily 5-day prediction of bloom transport and concentration.

HABs Bulletin | A weekly bulletin during harmful algal bloom season that provides information about bloom extent and toxicity in Lake Erie.

IAHR | International Association for Hydraulic Research

IceSAT | Ice, Clouds, and Land Elevation Satellite

IJC | The International Joint Commission is an independent binational organization established by the United States and Canada under the Boundary Waters Treaty of 1909. The two main responsibilities of the IJC is regulation of shared water uses and investigation of transboundary issues and recommending solutions. The IJC’s recommendations and decisions take into account the needs of a wide range of water uses, including drinking water, commercial shipping, hydroelectric power generation, agriculture, industry, fishing, recreational boating and shoreline property.

In situ | A term used in the aquatic science that refers to the examination of phenomenon exactly in place where it occurs, in the water (i.e., without moving it to some special medium).

IOP | inherent optical property

IPEMF | Integrated Physical Ecological Modeling and Forecasting, one of GLERL’s integrated research branches

IS | Information Services, one (of four) of GLERL's integrated research branches

IT | Information Technology | GLERL's IT team provides researchers and support staff with advanced data processing and storage capacity as well as basic computer and telecommunications capabilities.

LMFS | Lake Michigan Field Station, strategically located on Lake Michigan's Muskegon Lake Channel, supporting GLERL's long-term observations, field work, and process studies essential for understanding the Great Lakes ecosystem and developing future ecological services.

LTR | Long Term Research, a program led by GLERL's EcoDyn's team that integrates a core set of long-term observations on biological, chemical, and physical variables on Lake Michigan, accompanied by process studies and field experiments, for understanding and forecasting change on the Great Lakes ecosystem. The term is used in the context of a site and in particular, regarding the Lake Michigan LTR program, that is, the LTR program on southern Lake Michigan. although we currently have research programs on other lakes, none are consistent or extensive enough through all seasons to characterize them as LTR sites.

Meteotsunamis | Meteorological tsunamis or "meteotsunamis" are similar to seismic tsunami waves, with periods of 2 minutes to 2 hours. Meteotsunamis, however, are generated from meteorologic disturbances of strong gradients in wind speed and barometric pressure associated with a convection storm front. Often meteotsunami waves become dangerous when they enter a harbor or bay, in which amplification yields destructive wave heights. In the Great Lakes or enclosed basins, wave reflection and focusing can yield dangerous conditions along the open coast line.

MFW | Microbial food web representing combined trophic interactions among microbes in aquatic ecosystems, including viruses, bacteria, algae, heterotrophic protists (i.e., ciliates and flagellates) (*sensu stricto*) but often includes microzooplankton (*sensu lato*) in the 15-200 um range that may not be protists (e.g., rotifer).

Microcystis | A toxin-producing genus of freshwater cyanobacteria, which include the harmful algal bloom, *Microcystis aeruginosa*.

Microcystin | A class of toxins produced by certain freshwater cyanobacteria; primarily *Microcystis aeruginosa* but also other *Microcystis*. Microcystins can be produced in large quantities during algal blooms and pose a major threat to drinking and irrigation water supplies

MIL | Marine Instrumentation Laboratory supports GLERL research by providing the resources necessary to collect in-situ data from the Great Lakes and other areas of interest. The MIL uses a multidisciplinary approach in data acquisition, instrumentation and mooring design, fabrication, calibration, deployment and retrieval, real-time communications, data analysis, and quality assurance.

MSI | Minority Serving Institutions that comprise a category of educational establishments (federally recognized Title IV colleges and universities) based on enrollment criteria (typically the percentage of enrolled minorities at a particular school). Those meeting the MSI criteria are eligible for federal funding.

MOCNESS | Multiple Opening Closing Net and Environmental Sensing System is an apparatus used for fine-scale sampling of Bythotrephes, Mysis, and larval fishes

MTRI | Michigan Tech Research Institute

N | Nitrogen is a nutrient found in fertilizers and other materials, that can stimulate algal growth when transported to the aquatic ecosystems in run-off.

NCCOS | NOAA National Centers for Coastal Ocean Science

NEPA | National Environmental Policy Act is one of the first laws establishing the broad national framework for protecting the environment. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment.

NESDIS | NOAA National Environmental Satellite and Data Information Service

NMFS | NOAA National Marine Fisheries Service

NOAA | National Oceanic and Atmospheric Administration

NOAA Cooperative Institutes | The NOAA Cooperative Institutes are academic and nonprofit research institutions that demonstrate the highest level of performance and conduct research that supports NOAA's mission goals and strategic plan. The geographic locations of Cooperative Institutes extend from Hawaii to Maine and from Alaska to Florida. Currently, GLERL's Cooperative Institute is the Cooperative Institute for Limnology and Ecosystems Research, led by the University of Michigan.

NOAA's Ecological Forecasting Roadmap | An operational framework for a NOAA-wide ecological forecasting capability to effectively and efficiently provide dependable, higher quality forecast products on a broader scale with consistent delivery.

NOAA GLRCT | NOAA Great Lakes Regional Collaboration Team is one of eight NOAA regional collaboration teams across the country— comprises a flexible network that promotes coordination of NOAA's diverse assets within regions and collaboration with external partners to respond to stakeholders' shared regional concerns. The GLRCT is currently led by the Director of GLERL with support from OAR's Great Lakes Regional Team coordinator.

NOS | NOAA National Ocean Service

NWS | NOAA National Weather Service

OAR | NOAA Office of Oceanic and Atmospheric Research serving as GLERL's parent line office.

Operational | Reference to sustained, systematic, reliable, and robust mission activities with an institutional commitment to deliver appropriate cost-effective products and services.

OSAT | Observing Systems and Advanced Technology, one (of four) of GLERL's integrated research branches

P | Phosphorus is a nutrient found in fertilizers, and other substance, that can stimulate algal growth when transported to the aquatic ecosystems in run-off.

NOAA PARR | The Plan for Public Access to Research Results describes activities that will be undertaken by NOAA in order to meet the goals and requirements of the White House Office of Science and Technology Policy Memorandum Increasing Access to the Results of Federally Funded Scientific Research¹ issued February 22, 2013. The goal of PARR is to increase the public accessibility of publications and digital data produced by federal researchers or by recipients of federal funds.

Physiochemical | Relating to physics and chemistry or physical chemistry

PI | Principal investigator, typically serving as lead scientists for GLERL's research investigations.

QSEC | Quality, Safety, and Environmental Quality, the primary components of GLERL's quality management plan.

R2A | Research to applications refers to the pathway by which information from fundamental research is transferred to decision or other end users in a non-operational framework.

R2O | Research to operations refers to the pathway by which fundamental research is developed into a useful tool or product that is run regularly and automatically. These tools and products provide routine real time and forecast guidance for application and use by the public.

R2X | Research to operations or other applications refers to the pathway described by the following: "Application of the best available science and technology is essential to meeting the NOAA mission. This demands an operations enterprise that is able to quickly recognize and apply significant new research products and methods; a research and development enterprise focused on the ultimate application of emerging science and technology to user needs; and a formalized management structure that ensures that both the research and development enterprise encourage and support the transfer of research to operational status or information services to meet mission responsibilities." (NAO 216-105 | Policy on Transition of Research to Application)

ReCON | Real-time Coastal Observation Network is a project focused on the development of a national network of low cost coastal buoys capable of seabed to sea-surface observations. ReCON is built upon a wireless Internet observation system, with each system collecting meteorological data and providing sub-surface measurements of chemical, biological, and physical parameters.

Resilience | The ability of a system to absorb impacts without significant change in condition or functioning.

Transition | The transfer of knowledge or technology from a research or development setting to an application, including operational settings. Transitions occur in two phases | demonstration (e.g., the use of test-beds to confirm operational usability or demonstration using rapid prototyping), which is part of R&D, and deployment (e.g., the integration of new people, equipment, or techniques into an operational environment), which is part of applications, including NOAA operations. Transitions may occur from NOAA-conducted R&D to NOAA operations, from NOAA-conducted R&D to an external partner, or from external partner-conducted R&D to NOAA operations.

Vessel Recapitalization | Reorganization of GLERL's vessel capital structure to allow funds for sustainable vessel operations and future vessel procurement.

WRF-Hydro | Weather Research and Forecast Model for Hydrology